

What is claimed is:

1. A semiconductor device comprising:
 - a collector region of first conductive type formed on a semiconductor substrate;
 - a base region of second conductive type formed on the collector region of first conductive type;
 - a non-doped layer forming region formed in part of a surface region of the base region of second conductive type;
 - an emitter region of first conductive type formed in the non-doped layer forming region so that a bottom of the emitter region reaches the base region of second conductive type;
 - a base leading-out region of second conductive type formed on the base region of second conductive type;
 - a dielectric formed on an upper portion and a side portion of the base leading-out region of second conductive type and the non-doped layer forming region; and
 - an emitter leading-out region of first conductive type formed on the emitter region of first conductive type.
2. A semiconductor device according to claim 1, wherein the dielectric comprises a first dielectric formed on an upper portion and a side portion of the base leading-out region of second conductive type and the non-doped layer forming region; and
 - a second dielectric formed as a sidewall on the first dielectric on the non-doped layer forming region.
3. A semiconductor device according to claim 2, wherein the first dielectric is an oxide film and the second dielectric is a nitride film.
4. A semiconductor device according to claim 2, wherein the base leading-out region of second conductive type and the emitter leading-out region of first conductive type are made of polycrystalline silicon.
5. A semiconductor device according to claim 1, wherein the non-doped layer forming region is formed by epitaxially growing silicon.

6. A semiconductor device according to claim 5, wherein the dielectric comprises a first dielectric formed on an upper portion and a side portion of the base leading-out region of second conductive type and the non-doped layer forming region; and

a second dielectric formed as a sidewall on the first dielectric on the non-doped layer forming region.

7. A semiconductor device according to claim 6, wherein the first dielectric is an oxide film and the second dielectric is a nitride film.

8. A semiconductor device according to claim 5, wherein the base leading-out region of second conductive type and the emitter leading-out region of first conductive type are made of polycrystalline silicon.

9. A method for manufacturing a semiconductor device, comprising:
forming a collector region of first conductive type on a semiconductor substrate;

forming a base region of second conductive type on the collector region of first conductive type;

forming a non-doped layer forming region in part of a surface region of the base region of second conductive type;

forming an emitter region of first conductive type in the non-doped layer forming region so that a bottom of the emitter region reaches the base region of second conductive type;

forming a base leading-out region of second conductive type on the base region of second conductive type;

forming a dielectric on an upper portion and a side portion of the base leading-out region of second conductive type and the non-doped layer forming region; and

forming an emitter leading-out region of first conductive type on the emitter region of first conductive type.

10. A method for manufacturing a semiconductor device according to claim 9, wherein the formation of the dielectric comprises:

forming a first dielectric on an upper portion and a side portion of the base leading-out region of second conductive type and the non-

doped layer forming region;

forming a dielectric film on the first dielectric and the non-doped layer forming region; and

etching the dielectric film to form a second dielectric as a sidewall on the first dielectric on the non-doped layer forming region.

11. A method for manufacturing a semiconductor device according to claim 10, wherein the first dielectric is an oxide film and the second dielectric is a nitride film.

12. A method for manufacturing a semiconductor device according to claim 10, wherein the base leading-out region of second conductive type and the emitter leading-out region of first conductive type are made of polycrystalline silicon.

13. A method for manufacturing a semiconductor device according to claim 9, wherein the non-doped layer forming region is formed by epitaxially growing silicon.

14. A method for manufacturing a semiconductor device according to claim 13, wherein the formation of the dielectric comprises:

forming a first dielectric on an upper portion and a side portion of the base leading-out region of second conductive type and the non-doped layer forming region;

forming a dielectric film on the first dielectric and the non-doped layer forming region; and

etching the dielectric film to form a second dielectric as a sidewall on the first dielectric on the non-doped layer forming region.

15. A method for manufacturing a semiconductor device according to claim 14, wherein the first dielectric is an oxide film and the second dielectric is a nitride film.

16. A method for manufacturing a semiconductor device according to claim 13, wherein the base leading-out region of second conductive type and the emitter leading-out region of first conductive type are made of

polycrystalline silicon.